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We *Can* Sell More to Canada

ALTHOUGH more than a fortnight has elapsed since the Bank Rate was raised to 7 per cent, the short-term implications of the British Government's draconian measures to protect the pound and disinflate the national economy cannot as yet be clearly discerned. Whatever the duration of the higher Bank Rate, however, it seems quite evident that the new credit squeeze announced by the Chancellor must tend to stimulate exports, since overseas orders will presumably have a priority claim on the limited sums at the disposal of the banks. Moreover, the inevitable contraction of domestic demand can scarcely fail to enhance the attraction of overseas markets.

The possibility of selling more mining machinery and equipment to Canada—now Britain's third largest single market for exports as a whole—has frequently been mooted in this journal. Apart from the national importance of stepping up dollar earnings, the rapid growth of the mining industry confidently anticipated in the years ahead seems to offer outstanding prospects for the manufacturer whose products and after-sales service can meet the exacting requirements of Canadian buyers.

Interest in the potentialities of the Canadian market has been enhanced by Mr. Diefenbaker's announced policy of expanding Anglo-Canadian trade and Mr. Thorneycroft's proposal for a free trade area. Too much practical significance should not be attached to either of these possibilities at this stage, having regard to the difficulties presented by the Dominion's economic interdependence with the United States, which no Prime Minister of Canada is in a position to disregard. Moreover, it can scarcely be without significance for British exporters of mining machinery that over one-half of Canada's mining undertakings are financed by American capital, though by all accounts this will not prevent the companies concerned from being guided primarily by considerations of quality, price and service when placing orders for equipment.

Clearly it is on their own efforts and not on government policy that British exporters must base their plans for establishing their products on the Canadian market, and there appears to be general agreement among all those in a position to speak with first-hand knowledge that there is no effective substitute for personal contact. It is the more regrettable, therefore, that so few of our manufacturers of mining machinery took advantage of the unique facilities afforded by the Sixth Mining and Metallurgical Congress for meeting prospective customers and visiting the principal Canadian mining areas under the most favourable auspices.

It can scarcely be doubted that the mining machinery industry could with advantage follow the example of the Council of British Manufacturers of Petroleum Equipment in sending a goodwill and fact-finding mission to the Dominion. This mission's report has just been published and is obtainable from the Council's offices at 2 Princes Row, Buckingham Palace Road, S.W.1. (price 12s. 6d. net). Though concerned specifically with equipment used in the oil and petro-chemical industries, it contains much informa-

tion that would also be useful to manufacturers of mining machinery and equipment, to whom many of its findings and recommendations are equally applicable.

The mission found that, although at present U.S. investors own about three-quarters of Canada's oil and gas industries, British equipment is acceptable and welcomed in Canada, though direct importation from the U.K. accounted for only 7 per cent of the total purchases in recent years. It was concluded that, as far as could be determined, British industry was capable of satisfying the entire requirements of the Canadian market for refinery, process and production equipment, and a portion of the market for oilwell drilling equipment.

British goods were found to be competitive in price and quality. The principal reasons limiting the volume of U.K. sales have been relatively long delivery periods and lack of service outside the major outlets. The mission emphasizes that the Canadian market is highly competitive with regard to delivery, price and service, and concludes that there is a need for very active and aggressive selling. Canadian users, it was stated, welcome and actively encourage competition.

Another point emphasized in the report was the necessity for a prospective entrant into the Canadian market to visit the territory personally and cover the whole area, since agents and trading conditions vary widely. The opinion was expressed that it was preferable to cover a part of Canada thoroughly rather than the whole indifferently. It is not advisable to attempt entering the market unless competitive delivery periods can be offered and maintained.

Even if the first approach to the market is through agents, the desirable ultimate goal is regarded as maximum manufacture in Canada, achieved through the intermediate stages of direct representation, local assembly and part manufacture.

Active British participation in the principal Canadian engineering and trade conventions is recommended as being an effective means of making British equipment and achievements more widely known.

It will be seen that these recommendations parallel very closely the views put forward in our issue of March 23, 1956, pp. 360 and 361.

MINERAL EXPLORATION IN TANGANYIKA

Plans to strengthen the Mineral Exploration Team were hampered by staff difficulties, states the annual report of the Geological Survey Department of Tanganyika for the year ended December 31, 1956. Nevertheless, considerable progress was made on several projects, the most notable being the proving of the large titaniferous magnetite deposits at Liganga, Njombe District, where operations continued. Diamond drilling was undertaken to determine the size and grade of these deposits and is still in progress. By the end of the year 2,311 ft. of drilling, together with a detailed magnetometer survey, had been carried out.

Occurrences of asbestos at Huweberg and Mwiti River, in the Masasi District, were investigated. The deposits proved to be of no economic value, the fibres being very brittle and impossible to separate.

Copper-bearing reefs at Kamba Hill, Murito Hill and East Nyavirungu, all in North Mara District, were prospected, mapped and sampled. The occurrences are being investigated by a private company.

Pitting was carried out on occurrences of garnet at Namaputa in the Masasi District; the deposits proved to be of small size, but of good quality. A private company has been attracted.

Further work was done on the Lupa Goldfield, where the applicability of geophysical methods as an aid in the search for gold is being investigated. Although the geophysical results are encouraging, prospecting has so far failed to reveal any payable deposits.

Deposits of graphite at Ntaka, Nachingwea, Ndanda and other places in the Nachingwea and Masasi Districts were investigated by pitting and trenching. Some of the occurrences are extensive. Samples have been sent to the U.K., Germany and the U.S. for assessment of the grade and marketable value of the graphite.

A new occurrence of galena was discovered near Kabungo, Mpanda District, towards the end of the year. The information was passed to a company holding an exclusive prospecting licence in the area.

A report on Taribi Mica Mine was completed. Diamond drilling was carried out at Jumbadimwe Mica Mine, which proved the suitability of a light "X-ray" drill for exploring the mica pegmatites.

Examination, sampling and mapping of nickel-chrome serpentine prospects at Ngasamo Hill, Mwanza District, were carried out. Whether the deposits are of too low a grade to be economic at the present time is an open question.

BRITAIN'S SEARCH FOR RADIOACTIVE MINERALS

The success of the Atomic Energy Authority's nuclear power programme has done much to stimulate the search for the raw materials of atomic energy throughout the Commonwealth, states the Geological Survey of Great Britain in its annual report for 1956. As a result there has been a considerable increase in the number of enquiries both from individual prospectors and the larger mining houses.

In Great Britain an increased effort has been made to discover possible sources of uranium and thorium. Several old mines in Cornwall, at which uranium mineralization is known to occur, were rehabilitated; although no economic deposit has been found, geochemical researches have indicated a possible uranium area to be examined more fully next season. Acting on advice received from the Atomic Energy Division, a private prospector discovered a new area of thorium mineralization in Scotland, but, unfortunately, this did not prove to be of ore grade.

Field work was carried out during the year in Australia, Korea, Nigeria, Nyasaland, Northern Rhodesia and Southern Rhodesia. Visits were made to the Belgian Congo, Canada, Kenya, Malaya, Mexico, Portugal and the United States.

As previously reported in this journal, the Atomic Energy Authority signed a contract in March, 1956, with the Australian company, Mary Kathleen Uranium Ltd.—a member of the Rio Tinto Group—under which they are to buy uranium concentrates from this property over a number of years. The Authority also agreed to lend £5,000,000 sterling of the capital required to bring this property into production. Other potentially important prospects examined in Australia included those in the South Alligator River area in Northern Territory and on Storey's Creek in Tasmania.

An important discovery of monazite sand was made in Nyasaland by a geologist of the Atomic Energy Division in company with a geologist on the staff of the Geological Survey of Nyasaland. A prospector has since pegged an extended area in the vicinity of the original find and a major mining company is now showing interest in this prospect. A considerable amount of field and laboratory

work is necessary before the deposit can be finally assessed, but it seems evident from preliminary examination that production of monazite with possible by-products will be forthcoming. Elsewhere in Nyasaland, preliminary work undertaken by Division geologists has done much to stimulate the search for radioactive minerals and large mineralized outcrops have been located, the main uranium minerals being betafite, davidite and allanite.

Investigations in Nigeria have shown that large amounts of thorium-bearing minerals are available as by-products of the tin and columbite industries.

Geologists responsible for running the Atomic Energy Authority's office in Salisbury, Southern Rhodesia, have done much to further the search for radioactive minerals in the Central African Federation. Pitchblende and kasolite have been recognized for the first time in Southern Rhodesia and a new thorium mineral has been discovered for which the name "grayite" is proposed. It occurs in a lithium-bearing pegmatite and is intimately associated with thorite.

A new airborne scintillation counter developed by the Atomic Energy Establishment, Harwell, was tested in Cornwall and in the Central African Federation. Promising results were obtained, but a number of modifications were recommended. A second prototype instrument embodying these improvements is now ready for testing.

Three new lightweight Geiger-Muller counters were tested in the field. Production models of two of these instruments, which operate off ordinary torch batteries through junction transistors, were available by the end of 1956. The instruments weigh about 3 lb. and are of more advanced design than any others in production.

NEW MINERALS INDUSTRY FOR NATAL

A five-mile stretch of the Natal south coast, lying on the inland side of the Durban-Port Shepstone railway line, between the Umzimbazi and Ingane rivers, is to be mined for the production of the heavy minerals—rutile, ilmenite and zircon. Ilmenite will be produced at the rate of 100,000 tons a year, while zircon and rutile will be recovered at the rate of 10,000 tons and 7,000 tons annually, respectively. Umgababa Minerals Ltd., an associate company of Anglo American Corporation of South Africa, Ltd., is to start production towards the middle of next year. The bulk of its output will be exported to markets overseas.

Umgababa Minerals Ltd. was formed in June, 1956, to acquire from Titanium Corporation of South Africa, Ltd., the assets it owned in the area, comprising mainly mining and prospecting claims and certain plant and machines. A plant estimated to cost £1,500,000, for the extraction of the heavy mineral concentrates, is being established on a site between the South Coast National Road and the sea. The preliminary work of clearing and levelling the site for the new plant has been completed and erection work is now well under way. The plant and machinery, which were fabricated partly in the United States and partly in the Union, will be installed as soon as the plant buildings have been completed. Work has also started on the construction of a big concrete dam on the Umgababa river which will eventually cover an area of approximately 80 acres and will supply the mine's requirements of 500,000 gallons of fresh water per day.

When in production the mine will employ about 50 Europeans and 140 natives. It will bring a measure of prosperity to the natives living in the Umnini reserve, in which the mine is situated, for not only will employment be provided but, in terms of the South African Native Trust and Land Act, 10 per cent of the net profits of the company will become payable to the South African Native Trust for the benefit of the natives.

Mining at Umgababa will be essentially an earth-moving operation. Rotary bucket excavators will dig the sand from pits and feed it on to mobile stackers which in turn will discharge sand on to strike conveyors. These strike conveyors will feed the sand on to the main conveyor belt which will carry it from the mining area, under the South Coast Road, over the Durban-Port Shepstone railway line and feed it into the surge bins at the treatment plant. In the first stage of the treatment, the sand will be mixed with sea water, of which approximately 11,000,000 gallons a day will be used, and passed through a series of Humphrey spirals which will separate out the heavy mineral concentrate by means of gravity separation. The concentrate will then be washed with fresh water and separated into the three main constituent minerals—rutile, ilmenite and zircon—by electromagnetic and electrostatic separators.

A private railway siding will be constructed at the plant to serve the needs of the mine. Ilmenite, which will be transported in bulk in specially modified trucks will be railed to Island View, Durban Docks, where the company is to erect a bulk storage handling plant. The ilmenite will be fed from the dock silos on to a mobile stacker conveyor which will discharge the material directly into the ships' holds. This plant will be designed to handle ilmenite at the rate of 800 tons per hour. Rutile and zircon will be shipped in bags.

SURPLUS SMALL COAL

The British National Coal Board is now planning a major readjustment in its power-loading programme with the aim of concentrating on loading machines giving less fragmentation of the coal. In the post-nationalization drive towards increased mechanization too much weight has been given to the ability of a machine to produce the coal and insufficient attention has been paid to the condition of the product. Recently, concern has been felt at the threat of an unsaleable surplus of small coal—a surplus made at the expense of large coal production. The shortage of large coal has had to be made good by substantial imports.

Over the last six years output of small coal in the U.K. has risen from 67,000,000 tons, representing 34 per cent of deep-mined output, to 93,000,000 tons. In the same period output of large coal has fallen by 12,000,000 tons to 50,000,000. There can be little doubt that the increasing use of power-loading machinery during this period is responsible to a large extent, although the increasing use of explosives has also contributed. Recently it has become more and more difficult to sell all the small coal produced in Britain and these coals account for most of the record stocks now accumulated at the collieries.

In an endeavour to eliminate this build-up of small coal, the N.C.B. is taking four main steps.

(a) The government has been asked to revoke long-term contracts with the oil companies regarding the supply of fuel oil for dual-firing power stations. This may provide a yearly market for 10,000,000 tons of small coal by 1960;
(b) To press for an adjustment in coal prices intended to make the use of large coal for domestic space-heating penally expensive;
(c) Increasing use of alternatives to explosives;
(d) Greater selectivity in the choice of power-loading machinery.

It is recognized that (d) is likely to be the most successful and accordingly the Board is to concentrate on two types of power-loaders which produce lump coal—the Huwood Slicer and the A.B. Trepanner.

THE opening ceremony of the International Mineral Dressing Congress took place at the Stockholm Concert House, and after Mr. Evert Wijkander, President of Jernkontoret, had declared the Congress open, a lecture was delivered by Mr. Elmer B. Pehrson, Division of Foreign Activities, U.S. Bureau of Mines, on " The Metallurgist and the Future Mineral Supplies of the World ".

After paying tribute to Swedish engineers, Mr. Pehrson pointed out that it was necessary to have a steady supply of metal for the development of each country. Increase in production was not automatic but required a great effort to maintain it. A great deal of work had been done but much more was required since reserves were inadequate and the tempo of research must be increased to meet the situation.

On the subject of lower grade ores, the lecturer pointed out that whereas, at the present rate of consumption of 1½ kilos per capita, the world's resources of copper were about 70 years, if the use throughout the world increased to the same level as in the U.S., i.e. 8½ kilos per capita, the reserves were lowered to 10 years only. On the other hand if one could recover copper economically from a slightly lower grade than the present limit, a great increase in reserves could be shown. Development of low grade ores also applied to iron ores on which much work had been done.

Other angles touched upon included developing uses for further metals (for example, beryllium had many advantages in aircrafts), economic limits of price, political influences, and the impact of security measures such as stockpiling. In conclusion Mr. Pehrson said that the work of the metallurgist was to make better use of known sources and when the metal was becoming rarer to provide substitutes.

In all, 33 papers were presented, from 11 different countries, being divided into eight sections, covering comminution ; classification and gravity separation ; magnetic concentration ; roasting and sintering ; flotation theory ; flotation of sulphide ores ; flotation of non-sulphide ores ; mineral processing by chemical methods and a miscellaneous or " clean-up " session.

Comminution

In the first section, three papers were of a fundamental nature and one dealt with the layout and operation of the crushing and grinding section of a newly erected plant.

The first, " An empirical relationship between work imput and particle size distribution before and after grinding ", (I : 1), by Jonas Svensson and Jakob Morkes, records some of the research conducted by the committee on the theory of comminution.

This work revealed that the constant ratio between work imput and the surface area produced, as demanded by Rittinger, was not generally valid, whilst the theories of comminution evolved by Kick and Bond corresponded even less satisfactorily. As a result of these observations, the committee investigated the possibility of some other empirical relationship between work imput and particle size distribution and have suggested a relationship which they consider meets the case. These workers have confirmed the findings of Gross and Zimmerley that Rittinger's law appeared to hold good over a certain range, but when the specific surface exceeded 2500 cm^2/cm^3 it is not valid. The work of many other investigators who showed that Rittinger's relationship was much more accurate than that suggested by Kick, was confirmed and accuracy of Bond's third theory over a wide range is questioned.

From examination of curves showing the energy consumed as a function of the reciprocal of the square root of the size which 80 per cent of product passes, the authors suggest that the following expression is more valid than Rittinger's or Bond's expressions :—

$$E = E_0 \left\{ \frac{(100)}{(k_{80})} - \frac{(100)^m}{(k_{80f})} \right\}$$

Where : E = work imput in kWL/ton
E_0 = a proportionality factor
k_{80} = particle size of the ground product at 80 per cent passage in microns
k_{80f} = particle size of the feed product at 80 per cent passage in microns

In this case m is a value rather greater than ½ and appears to vary from 0.8 to 1.3. The authors also found that the formula is true for any per cent of passage whatsoever, although the value of E_0 and m are affected by the passage per cent. The use of the 80% passing figure has been criticized as the authors say it can lead to error in some instances and suggest that in order to obtain a reasonably true measure of comminution, a mean value of particle size should be taken for all percentages of passage.

Some criticism was made by Prof. Hukki in the subsequent discussion that the authors had not measured the net energy used and the question of the resulting variable might be serious. The findings of Svensson, however, were confirmed by another speaker, who said that work of grinding coke in France came to the same conclusion.

Advances

In the second paper, " The effect of some surface active reagents on the comminution of Limestone and Quartz " (I : 2), by A. Z. Frangiskos and H. G. Smith, the effect has been studied by experimental work in a miniature stamp mill and making surface area measurements on each sample tested.

The results indicate that in crushing limestone and quartz such reagents influence comminution since, when crystals formed of atoms bound together by electrovalent or covalent bonds, are fractured, the residual electrical forces are satisfied by substances present in the ambient phase and prevent the reunion of the surfaces of fracture which may be formed momentarily. Such surface active agents may penetrate micro-cracks, even if only for a very short distance, so that when the deforming force is removed, the closing of the micro-cracks will be delayed or even prevented by the adsorbed layer.

Tests have shown that sodium carbonate and sodium hydroxide up to about 250 mg. increased the surface area appreciably, but in much greater concentrations there was no appreciable effect.

With quartz using sulphate and aluminium chloride, conditions of operation appear to have affected the results, but generally it was found that presence of surface active agents increased the new surface produced.

Probably the third paper in this section has produced the most startling results and provided food for discussion. Prof. Pryor in subsequent discussion raised the question of the effect of *p*H due to the electrolyte and its influence on flocculation. He suggested that it might be responsible for alterations in the surface and that the effect should be investigated.

In " Grinding at Supercritical Speeds in Rod and Ball Mills " (I : 3), by R. T. Hukki, a preliminary report is given

of grinding experiments designed to cover not only the subcritical, but also the supercritical speed up to the *de-facto* centrifuging speed.

It is clear that the well-known expression for critical or centrifuging speed is not correct and observers have noticed a divergence for some years.

The relationship between the power draft, the theoretical critical speed and the actual centrifuging speed has been studied and it has been shown that the critical speed has no bearing whatsoever on grinding. It has also been shown that the actual centrifuging speed of the mill increases with decreasing tumbling load ; that the centrifuging speed for small tumbling loads can be manyfold the theoretical critical, and as the load was increased, the centrifuging speed was reduced. Furthermore, the power/speed curve approximates that usually given in text books when a 50-60 per cent ball load is used but that the hump becomes less pronounced and moves towards a higher speed when the ball load is reduced.

It is clear that usually there is very considerable slip which is responsible for the higher centrifuging speed and that a ball or rod mill can be made to centrifuge at the theoretical critical only if slipping is prevented. It is claimed that in mills operating at supercritical speeds, a very effective zone of grinding is formed between the outer layer or media and the shell lining. Under such conditions the outer layer of the media travels in the direction of the mill rotation at a speed lower than the peripheral reference speed, whilst the mill shell rotates at a faster speed. In this way the amount of attrition grinding increases rapidly with increasing mill speed in the supercritical range.

The dynamics of tumbling mills have been analysed and an expression given for the relation between the centrifuging speed and the critical speed. The relationship between mill capacity and the specific gravity of the tumbling media and the wear on mills run at supercritical speed is also discussed. As far as wear is concerned, the effect of frictional wear due to the slippage of the ball charge is much greater with these very high speeds.

The general idea is that fine grinding mills should have smooth lines and should be run at the optimum speed in the supercritical range — the finer the desired product, the higher the speed.

As might be expected this paper produced considerable discussion and in a written contribution from Fred. C. Bond (Allis Chalmer Co.) results of test work carried out by him were quoted showing that less work was done in relation to the power used as the speed of the mill was increased.

Bowdish, from France, suggested that when the outermost layer of ball centrifuged, it was possible that some of the pulp also formed a layer near the liner which would not be ground ; he cast some doubt on the practical advantages of grinding at super-critical speeds.

In reply, the author pointed out, however, that in the following paper, a commercial operation was described in which some mills were operated at 106 per cent of " critical " using ribbed linings.

The fourth paper, " Crushing and Grinding at Outokumpu " (I : 4), by H. Tanner and T. Heikkinen, describes the plant at the new Keretti plant in Finland. Some interesting observations were made on the operation of the pebble mills. Chief amongst these are the facts that the grinding capacity of the mills increased with decreasing pulp density and increased pebble charge, and that speeds greater than normal gave good results.

Classification and Gravity Separation

Five papers comprised the section on classification and gravity separation. The first paper " The newer classification tools — their evolution and recent applications " (II : 1), by H. W. Hitzrot, is simply a review of the development and commercial application of the hydraulic cyclone, the stationary D.S.M. screen (or sieve-bend) and the bowl desiltor.

In the second paper of this section, " The Influence of the Orifices on the Washing Characteristics of the Hydrocyclone " (II : 2), by M. Stas, the author described a study of the flow in a cyclone with water only establishing a law linking the flow through the orifices with the ratio of their diameters as follows :

$$\frac{Q_1}{Q_2} = \left(\frac{D_1}{0.921 D_2}\right) 3.5$$

Where Q_1 and Q_2 are the volumes of underflow and overfloe respectively and D_1 and D_2 the lower and vortex finder orifices respectively. From further investigations, using magnetite as the medium, curves have been constructed showing the variation in density of separation.

From such curves, it is possible to analyse the operation of a cyclone used as a coal washer and estimate the influence of wear on the lower orifice at a constant feed density, as well as to draw conclusions regarding the influence of this density. These curves can be applied generally to ores as well as coal.

Some of the conclusions were questioned in the discussion, when the point was made that conditions were completely different in cyclones used as classifiers and those used as a concentrator (i.e. with a dense medium).

G. Gerth, in " The Influence of Surface Properties, Grain-shape and Grain-size of the Medium on Adhesion Losses in Sink and Float Separation " (II : 4), showed that minerals of a columnar form exhibit the lowest adhesion loss and the flattish minerals the greatest loss. The adhesion loss also depends on the medium density and particle size ; the finer the feed, the greater the loss.

The influence of surface characteristics was also discussed and the depth of roughness correlated with adhesion loss.

In another paper in this section, "Jig Concentrate and Flotation Concentrate as heavy media at the two Huntington-Heberlein Sink-Float Plants of the Montevecchio Co." (II : 5), by G. Bellavita and R. Antoniolli, the plants and means for preparing the media were described, but this paper was not presented by the authors ; no verbal discussion took place.

Our correspondent's review of the Congress will be continued in a subsequent issue.

In Mineral Dressing

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The International Mineral Dressing Congress, held at Stockholm from September 18 - 21, 1957, is here reviewed by Our Own Correspondent.

At left is a general view of the Monazite and Mineral Ventures mine near Van Rhynsdorp, Namaqualand. Below, care of the labour force is illustrated by the view of employees' houses in foreground

MINING RARE METALS IN NAMAQUALAND

This article is condensed from "Optima", Volume 7, No. 2, a quarterly review published by Anglo American Corporation of South Africa. The author, Mr. H. MacConachie, is the consulting engineer responsible for the Anglo American Corporation Group gold mines in the Orange Free State and on the West Witwatersrand, and the monazite mine in Namaqualand

BEFORE the discovery of the orebody at Steenkampskraal, Namaqualand, the known occurrences of monazite in South Africa were too small to have any economic value and were only of academic interest. Until a few years ago the main producer of monazite was India, where the mineral is derived as a by-product from the ilmenite-bearing sands in the province of Travancore. But the Indian Government prohibited the export of monazite and the resulting world shortage stimulated the search for other sources of supply. These have been found in Brazil, California and South Africa.

The farm Steenkampskraal lies 50 miles north of Van Rhynsdorp. It is reached by a reasonably good gravel road branching from the main road to Springbok. The railhead at Bitterfontein lies 20 miles to the west of the farm, but, as there is no direct road to this settlement, all stores are transported from the railway station at Klaver, 14 miles south of Van Rhynsdorp and 64 miles from Steenkampskraal.

The mine itself is situated on a low hill with two summits about 200 ft. above the surrounding country. The eastern summit is composed of gneissoid granite. The western summit is quartzite of pre-Cambrian age overlying the granite. Striking east to west and dipping fairly steeply to the south, the monazite-bearing vein traverses the granite.

The monazite has been emplaced as a lode in a conspicuous shear zone whose plane dips more steeply than the foliation of the granite. The true vein on surface is about 900 ft. in length, and for a length of 600 ft. from its western extremity it varies from 1 ft. to 5 ft. in true width. Beyond the eastern end of this 600-ft. stretch, the vein narrows to a few inches in width for a further 300 ft., when it terminates in the granite as a vein of quartz. Development to a vertical depth of 300 ft. and diamond drilling at greater depths show that the orebody continues to pinch and swell in the same way as it does at surface, and that the dip varies from a few degrees to vertical.

Developing the Property

Early prospecting and mining by a small syndicate of local people was confined to the outcrop. The monazite was crushed to less than 3 in. in size and eventually exported to the United Kingdom.

This was the position when the property was visited and reported upon by the consulting geologist of Anglo American Corporation in July, 1951. After the inspection it was considered that, provided the lode persisted in depth, there was every prospect of a profitable mining venture being established in view of the increasing world demand for the rare-earth metals and thorium. Negotiations were then concluded for an option on the property for a period of 12 months beginning in November, 1951.

By the end of November, the camp had been established, the concrete collar and headgear of the shaft completed and the shaft sunk to a depth of 30 ft.

The first diamond drill hole intersected the orebody before the end of November at a vertical depth of 175 ft. The shaft was completed in the middle of January, 1952, a cross-cut from the shaft intersected the lode, and driving on the lode on the 100 ft. level was then started. By the middle of 1952 sufficient development and diamond drilling had been accomplished for the value of the deposits to be assessed. In July, 1952, Anglo America Corporation exercised its option on the property and acquired the major interest in, and assumed technical and administrative control of, the company that had been formed to exploit the deposit—Monazite and Mineral Ventures, Ltd.

Bulk samples of the ore were sent to the Corporation's Central Metallurgical Laboratory, and, after exhaustive tests and experiments, a flow sheet for a concentration plant was drawn up. As far as is known, there was, at that time, no plant treating ore of that nature from which information could be obtained. In view of the complexity of the concentration process, therefore, a great deal of thought had to be given to the design of the final plant.

The search for water near the mine had been unsuccessful, and it was realized early in 1952 that there was no prospect of obtaining water in any significant quantity at a reasonable distance from the mine; it was also found that all samples of water taken within a radius of 25 miles from the mine were brackish and, owing to the high mineral content, completely unsuitable for use in the proposed type of concentration plant. The nearest source of fresh water that was accessible by road from the mine was at Klaver, 64 miles away, and it was then visualized that the concentration plant would be erected near the railway marshalling yards at Klaver and below the Olifants River irrigation canal from which an ample supply of water could be obtained. The ore would then have been sorted and crushed at the mine and transported to the concentration plant. Water for mining and domestic use at the mine would have been obtained from local sources supplemented by a small amount of fresh water transported by the empty ore lorries on their return journey.

Siting the Plant

Later, however, when the design of the plant was being completed, it was decided to follow normal mining practice and erect the plant at the mine, where all operations could be controlled from one centre. An agreement was concluded with the Road Motor Transport Division of the South African Railways whereby they would undertake the transport of concentrates from the mine to Klaver station and the transport of water from the irrigation canal to the mine.

Construction at the mine was started towards the end of 1952. Houses for employees, a compound for natives and, later, a power and compressor station were built. The power station has a nominal generating capacity of more than 1,100 kVA., and consists of four diesel-driven units. The compressor plant comprises two units, each capable of delivering 500 cu. ft. of air a minute. Among other buildings are offices, a store, workshops, the concentration plant and powder magazine.

A main incline shaft has now been sunk to the orebody and the concentration plant has been sited so that ore hoisted through the incline shaft is delivered direct to the crusher bins. The crushing section of the plant consists of a primary and a secondary crusher from which the crushed rock is conveyed by a belt conveyor to a ball mill in closed circuit with a spiral classifier. The pulp from the classifier overflow is then treated by flotation to produce the concentrate, which is filtered, dried and bagged for export.

The main construction at the mine was completed early in July, 1953, and thereafter various sections of the concentration plant were brought into commission.

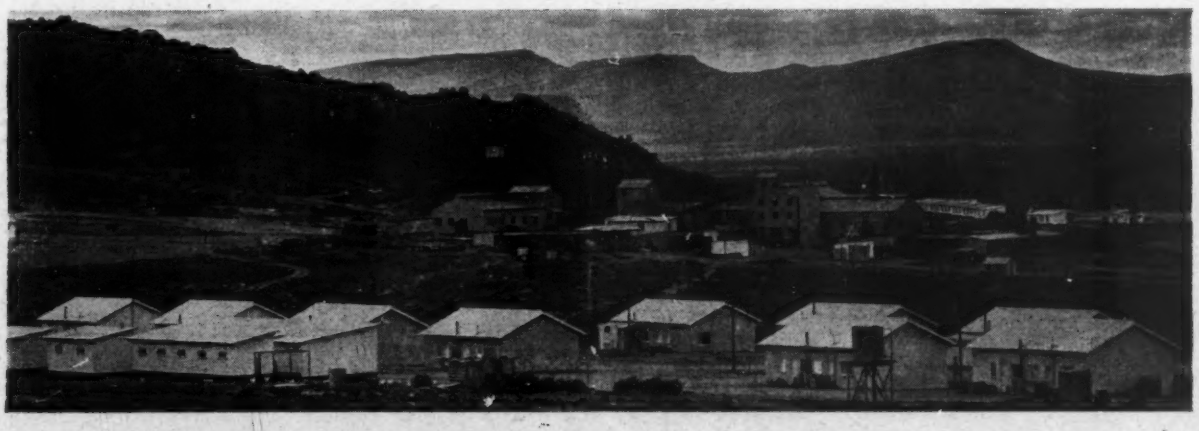
Mining Conditions

Mining presents few problems, the granite country rock being fairly strong and the orebody solid and not hard to drill. All drilling is done with jackhammers, those used in development being equipped with air-legs. Tungsten-carbide-tipped drill rods are used.

The dip in the stopes varies considerably, and local conditions determine the method of removing the broken ore. Wherever possible, the ore is gravitated to the loading chutes, but it has to be assisted by scraping in the flatter areas. The workings are supported by timber packs, supplemented by pillars of ore left in position wherever necessary; in addition, props with headboards are freely used. The ore left in the pillars will be subsequently reclaimed.

Namaqualand, in which the monazite deposits lie, has always been regarded as an area rich in base metals and diamonds. The copper mine at O'okiep was restarted in 1940. Diamonds were discovered near the mouth of the Orange River in 1926. In the Van Rhynsdorp district, gypsum deposits are being extensively worked, and about 20 miles to the west of Steenkampskraal a bed of marble is quarried.

There is no doubt that the discovery and exploitation of the monazite deposits on Steenkampskraal has focused greater attention on the general mineral possibilities of this district.



CHILE AS A MARKET FOR

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CHILE is basically a mining and agricultural country and imported equipment is required for these activities. Both mining and agriculture are at present at the early stages of new development plans which will lead to an increase in imports of capital equipment.

For many years the growth of investment in Chile in relation to national income has been below the average for Latin America and also below Chile's investment needs. This is to be ascribed at least in part to the progressive devaluation of money due to inflation; and the stabilization of the economy may be expected to lead naturally to an expansion of productive investment, both private and government-sponsored.

In Chile an institution known as the Corporacion para el Fomento de la Produccion, generally called CORFO, occupies a position of central importance in capital development. CORFO is a State organization established by law in 1939. Its responsibilities cover the planning and execution of production projects and the acquisition of equipment from abroad. Its objects are to assist in the development of Chile's basic resources and in the growth of industry and especially to assist developments which are either beyond the resources of private capital or not sufficiently profitable to attract it. Although a State organization deriving its main funds from the budget, CORFO operates autonomously. It is divided into ten departments, some operational, some administrative. The three operational departments are : agriculture, mining and fuel, and industry and energy.

Copper is Chile's main industry. It supplies some 60 per cent of Chile's foreign exchange earnings and an even higher percentage of the State's revenue. About 90 per cent of Chile's copper production comes from mines belonging to two United States companies, Anaconda and Kennecott. Anaconda have two companies in Chile; the Chile Exploration Co., operating the Chuquicamata mine, and the Andes Co., operating the Potrerillos mine. The Kennecott subsidiary in Chile is the Braden Copper Co. Production at the mines belonging to these companies amounted in 1956 to 443,030 tonnes.

Copper Production

Production at other mines in Chile was estimated at 45,000 tons, giving a total production in Chile of 488,030 tons. Chile thus became once more the second largest producer in the world in 1956. Total production in previous years was : 1955, 433,520 tons and 1943, 363,655 tons. In 1948 production was 445,067 tons.

The Chuquicamata mine has the only electrolytic refinery in Chile. It exports electrolytic copper and blister. Only blister is produced at Potrerillos, where production is running down. The El Salvador mine near by is being opened up and the Anaconda Co. are making large investments there. The sum allocated has been announced as $80,000,000. The Anaconda Co. are also—through a third company known as the Santiago Mining Co.—developing the mine known as La Africana near Santiago.

The Braden Copper Co. operates the El Teniente mine some 50 miles south of Santiago. The Braden company export fire-refined and blister copper as well as some molybdenite.

The passing of a new Copper Law in May, 1955, gave a fillip to investments at the United States-owned mines in Chile. This law put the taxation of the companies on a more normal and acceptable basis with provision for taxation to be reduced as production rose; it also allowed the companies to convert their foreign exchange to meet operating costs in Chile at the normal commercial rate of exchange. The copper companies' investments enjoy all the facilities of legislation introduced in Chile in 1953 and 1954 to encourage the investment of foreign capital.

The following are some details of initial expenditure planned by the Anaconda Co. for the development of the El Salvador mine to give an idea of market possibilities. This expenditure is exceptional but it may be expected to recur, possibly on a more reduced scale, as production is expanded. In a few years' time, for instance, Anaconda may install a new smelter to handle the El Salvador production.

In $U.S. : Railroad, 1,050,300; crushing plant, 3,263,500; pipe lines, 2,842,000; main railway tunnel, 1,600,000; main shaft with hoists, 300,000; underground ore bins, 360,000; town development—housing, hospital, roads, services, etc., 4,680,000; mine development, 5,400,000; exploration, 1,200,000; workshops, power and ventilation, 1,800,000; concentrating plant, 9,451,600; concentrating bins, 715,600; tailings dams, 300,000; roads, 685,000; excavations and communications, 400,000; power plant (hydro-electric plant of 2,700 kW.), sub-stations and transmission lines, 2,535,000; construction equipment, 3,050,000; warehouse, 50,000; engineering and supervision, 1,165,000.

The Braden Co. are at present investing less in Chile than Anaconda, but all these mines have regular purchasing programmes for the routine renewal of plant and the replacement of short-life machinery. Such purchases cover a wide range of equipment from tractors, trucks, locomotives and rolling stock to generating equipment, grinding balls, conveyor belting and piping. The Braden Co. reckon to spend an average of about $2,000,000 a year in imported goods of this sort. The Anaconda Co. presumably spend more.

The United States copper mining companies place all their orders through their head offices in the United States though in all important cases the placing of the orders is decided in agreement with the mine management. Orders normally originate with the latter, but the head office is responsible for the purely commercial aspects of the orders. It must be assumed that any unfamiliar equipment not previously sold to the United States companies is only likely to be sold if the mine management express a wish for it, and any British manufacturer who is trying for the first time to sell his products to the American companies should make it his business first of all to convince the mine management. The U.S. companies buy most of their equipment in the United States, but neither Anaconda nor Braden has any exclusive " Buy American " policy.

Other foreign companies are on the point of making investments in copper mining in Chile. The Cerro de Pasco Corporation, which is mainly active at present in Peru, is engaged in exploratory and preparatory work on a concession high up in the Andes near Santiago. The Marvis Corporation S.A. of Panama, which is a Hochschild interest (the U.K. associate company is South American Minerals and Products Ltd. (Exsud), 26 Cowcross Street, London, E.C.1), has formed a company to exploit a concession known as Mantos Blancos in the region of Antofagasta. This is a medium-sized operation, likely to produce about 1,000 tons of ore a day.

Independent Mines

Apart from the American group, generally called the big mines group, copper mining enterprises in Chile are usually classified as the small and medium mines. With the exception of half a dozen or so of the larger of these companies which operate independently, all operate in conjunction with the Caja de Credito y Fomento Minero (Mining Credit and Development Fund) which is a State organization. None of these mines produces copper in more advanced form than concentrates. The independent mines send their production for refining under toll agreements in United States or Germany. The smaller mines sell their production to the Caja for refining either at the National Smelter at Paipote or in the United States or Germany. Paipote produces some 15,000 tons of blister a year which is shipped abroad, mostly to Germany.

The larger independent mines are good potential clients for British machinery. Among the more important are the Compania Minera Disputada de Las Condes and the Compania Minière M'Zaita, both of which are subsidiaries of the Société Minière et Metallurgique de Penarroya, the Compania Minera de Tocopilla and the company Paulino Callejas e Hijos, the two last-named are entirely Chilean companies. These companies each produce between 600 and 900 tons of copper ore a day.

The Empresa Nacional de Fundiciones which was recently created to operate the National Smelter at Paipote is planning the installation of a further smelter and electrolytic refinery. Bids for this installation have been invited from United States and German firms.

In spite of the development of synthetic production and the consequent decline in the use of natural nitrate since

MINING EQUIPMENT

1918, Chile's natural nitrate industry is still her second most important export industry after copper. The nitrate industry in Chile at present consists of twelve Shanks plants (the original process) and three bigger plants using the more modern mechanized Guggenheim process. These three plants belong to two large companies. The United States-owned Anglo Lautaro Nitrate Co. operates the two plants of Maria Elena and Pedro de Valdivia; the third plant at Victoria is operated by the Chilean Compania Salitrera Tarapaca y Antofagasta. These companies are big potential customers for a wide variety of the capital goods associated with mining—from the extraction and milling of the nitrate-bearing ore to the production of the final refined nitrate of soda, transportation to the coast and loading in ships. The mining is all open-cast and does not go underground. Anglo Lautaro export nitrate in granulated form; the Tarapaca Antofagasta Co. in crystallized.

Nitrate and Coal

In 1956 the nitrate industry concluded a revised agreement with the Chilean Government giving it more satisfactory conditions in the matter of taxation, government participation in profits and exchange rates. Both of the two large companies have since embarked on development projects involving in the case of the Anglo Lautaro Co. expenditure of $25,000,000 ($16,000,000 in foreign currency purchases) and in the case of the Tarapaca Antofagasta Co. $16,000,000 ($9,000,0000 in foreign currency). The foreign currency expenditure under these development projects will be financed by Eximbank loans which limits purchases to the United States.

Neither company normally follows an exclusive "Buy American" policy. Both are represented in London by the Nitrate Sales Corporation of Chile, Chile House, 20/24 Ropemaker Street, London, E.C.2. They are regular buyers of surface mining equipment, ore crushing plant, conveyor belting and various types of equipment. Tarapaca Antofagasta, the smaller of the two, claims to spend on an average £30,000 a month on spares and replacement equipment in the United Kingdom. They find that most United Kingdom equipment is lower in price than American equipment though delivery is slower.

The prospects for the Chilean nitrate industry are somewhat uncertain owing basically to the constantly expanding competition of synthetic nitrate.

There are two main coal mining companies in Chile, the Compania Carbonifera e Industrial de Lota and the Compania Carbonifera y de Fundiciones de Schwager. Both mines are at Coronel, near Concepcion, and both have their head offices at Valparaiso. Total production in the country is a little over 2,000,000 tons a year of which Lota produces approximately 1,000,000 tons and Schwager somewhat over 700,000 tons. Domestic production supplies all Chile's needs except for a quantity of metallurgical coal imported by the National Steel Mill at Huachipato.

Both Lota and Schwager have extensive modernization and development plans to be carried out over the next six years and the International Bank for Reconstruction and Development has recently granted loans to finance the plans. The Lota Co. plan contemplates the investment of $7,000,000 during the next five years, while the Schwager programme represents expenditure equivalent to £2,365,150 between 1957 and 1963.

Schwager was a British foundation and is still British-managed. Lota employs some British management personnel. Both companies have a considerable amount of British equipment and are still prepared to buy in the United Kingdom. United Kingdom manufacturers have, therefore, every chance on a competitive basis of getting a good share of the orders placed under the development plans.

This review of the mining industry in Chile is based on a report prepared by the Commercial Department of H.M. Embassy, Santiago, as one of a series of reports issued by the Export Services Branch of the Board of Trade to assist in the assessment of South American markets.

MINING MISCELLANY

A survey of old lead and zinc mines at Caim, County Wexford, Eire, is now in progress. These mines have not been worked for 100 years.

★

The element rhenium has been found in deep layers of copper ores in the Jezkasgan deposits in central Kazakhstan, U.S.S.R.

★

The Ministry of Industries, Ceylon, has announced the completion of arrangements for United States experts to tap the island's iron ore resources.

★

The British Newfoundland Corporation has reported an "interesting" uranium showing on its lease on the Labrador Coast, near Kaipokok Bay, 125 miles north-east of Goose Bay.

★

Plans are in hand for opening a new magnesite quarry in Czechoslovakia near the Russian border. The available reserves are estimated at 100,000,000 tons of magnesite of the highest quality, and further deposits are still being located.

Output of bauxite in Italy declined in the first half of 1957 to about 114,000 tons from 121,000 tons in the comparable period of 1956. On the other hand, production of aluminium rose to 32,000 tons from around 29,000 tons in January-June, 1956.

★

General Franco has opened the first of four blast-furnaces being constructed at the State-sponsored steel plant in Aviles, western Spain. Designed and erected by Head Wrightson and Co., this furnace will produce sufficient pig-iron for an annual steel output of 300,000 tons.

★

On his return from Greenland recently, Professor Niels Bohr expressed cautious optimism about the prospects for uranium in that territory. Twenty tons of ore from the Narssaq area in South Greenland will be brought to Denmark in the autumn by the Cryolite Co. for extraction studies.

★

Discussions have taken place between representatives of the Ministry for Greenland and two commercial companies, Oceatic Iron Ore of Canada, Ltd., and Atlantic Iron Ores, Ltd., who propose to construct harbours for the transhipment of iron ore at Rype Island, near Godthaab, and at Marraq, between Faeringehavn and Fiskenaes.

★

The Hungarian Metal Research Institute claims to have developed a novel process for the extraction of gallium metal from ores. The process is reported to enable about 1 kg. of pure gallium metal to be produced comparatively cheaply from about 10 cu. metres of lye from the processing of bauxite into alumina. Only experimental quantities of metal have so far been extracted.

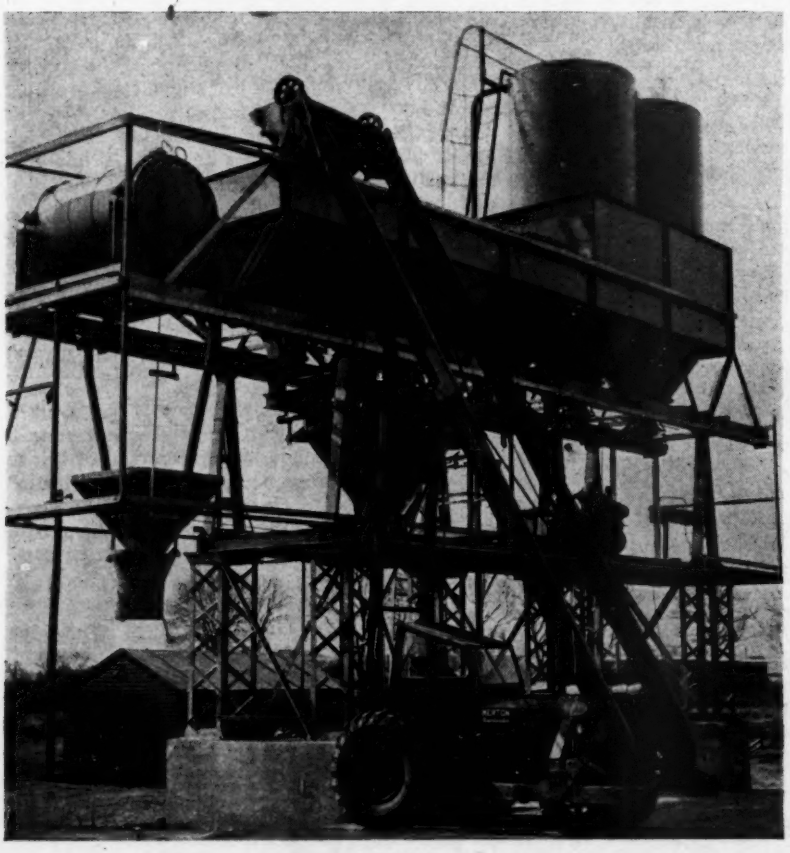
★

Despite the strikes which occurred, the value of minerals produced in Northern Rhodesia last year reached the record total of £130,148,615—an increase of £7,160,756 over 1955, states the Mines Department annual report for 1956 (price 2s.). This increase was due to the increased production of electrolytic copper, manganese and cobalt, the production of cadmium for the first time, and the record prices received for copper, especially during the first quarter of the year.

★

The Ungava Iron Ore Co., it has been announced, is investigating the large deposits of low-grade iron ore at Ungava Bay, Labrador; problems relating to their mining, transport to Europe, and other connected matters. The company was set up jointly by Mr. Cyrus Eaton, the concessionaire for the area, and a German consortium, each having 50 per cent of the shares. Members of the German consortium are the Huettenwerk Rheinhausen, owned by Krupp, and four big iron and steel and engineering concerns —Westfalen Huette, Mannesmann, Gute Hoffnungshuette and Bochum R. Verein. No decision to undertake investments in the area will be taken until the full results of the company's investigations are known, which may be "anything up to another 18 months". The option on the deposits offered by Mr. Eaton to Krupps expires in 1959. The question of transporting the ore to Europe is complicated by the fact that Ungava Bay is open to shipping for only two to three months of the year.

Mackay Industrial Equipment Ltd., concessionaires for the Merton Overloaders and Two-Way Loaders, claim the new 26 ft. discharge overloader has a greater discharge height than any other wheeled loader. This special overloader is powered by a Fordson Major 4-cylinder diesel engine and has six forward and two reverse gears. The ¾ cu. yd. bucket is cable-operated and travels from the digging to the discharge position on overhead rails. The photograph shows a 26 ft. Merton overloader, owned by Turriff Construction Co. Ltd.



PERSONAL

Mr. H. V. Smith has resigned from the board of the Consolidated Diamond Mines of South-West Africa, Ltd.

★

Mr. L. E. P. Tylor, of Coward, Chance and Co., has accepted an invitation to join the board of Ruston-Bucyrus, Ltd.

★

Mr. Charles Parsons, representative of the Consolidated Pneumatic Tool Co., Ltd., in the Middle East, died suddenly in Beirut on September 9.

★

Mr. W. Pring has been appointed a director of Turriff Construction Corporation, Ltd.

Mr. A. Frost has joined the board of Marievale Consolidated Mines, Ltd.

★

Sir Ewen Fergusson has joined the board of Rooiberg Development Co., Ltd.

★

Mr. W. A. Hutchison has resigned as managing director of Preston East Dome Mines, Ltd.

★

Mr. R. M. Bateman, Mr. N. A. Morling, Mr. G. S. Sutcliffe, and Mr. J. A. E. Clogg have accepted invitations to join the board of Turner and Newall, Ltd., as from November 1, 1957.

★

Mr. John H. Hohnen, managing director of New Guinea Goldfields, Ltd., has been appointed by the Governor-General of the Commonwealth of Australia to the Legislative Council of Papua, New Guinea.

★

Mr. F. E. Hay has joined the board of Modderfontein East, Ltd., and has been appointed chairman and managing director in succession to Mr. N. W. S. Lewin, who remains a director. Mr. P. H. Anderson has resigned from the board.

★

Mr. Douglas A. Dew has joined the board of Barrow Hepburn and Gale, Ltd. He has been in the company's service for twenty years and was general manager of its activities in conveyor and transmission belting for the past five years.

★

Dr. Neville M. Potter, chief scientist in East Midlands Division of the National Coal Board since 1947, has been appointed assistant general manager of No. 6 Area (North Barnsley) of the North-Eastern Divisional Coal Board as from November 1.

CONFERENCES AND EXHIBITIONS

"Preparing for the challenge of European Free Trade" will be the subject of a conference at the Royal Festival Hall, London, on Monday, October 28, 1957, which has been arranged by the Incorporated Sales Managers' Association.

★

The annual general meeting of the North Staffordshire Institute of Mining Engineers will be held on October 7, 1957, at 5.30 p.m.

★

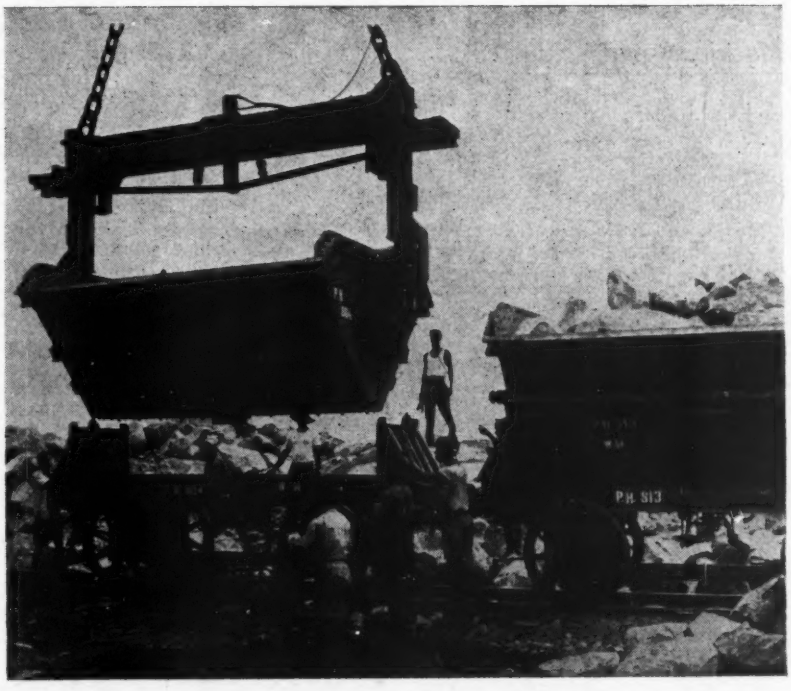
The main Convention paper at the Materials Handling Convention, which opens at Leamington Spa on October 28, will be presented on October 30 (the final day) by Dr. K. D. Tocher, Research Applications Manager, Operational Research and Cybernetics Department, the United Steel Companies, Ltd.

★

A general meeting of the Cornish Institute of Engineers will be held on October 15 at 7.15 p.m. in the lecture theatre, Camborne School of Mines.

★

An exhibition to bring industry the latest information about the uses and developments of nickel, nickel alloys and related materials, is to be held by the Mond Nickel Co., Ltd., at the Royal Station Hotel, Newcastle upon Tyne, from November 5 to 8. It will be open from 10 a.m. to 7 p.m. daily.



The breakwater and harbour works now under construction at Tema, Ghana, was featured in our issue of September 13, 1957. Block stone for harbour construction is transported in Hudson 300 cu. ft. capacity automatic tip wagons. Here, one of these wagons is being loaded. The lifting beam incorporates CP 9 in. dia. rams

★

The permanent body on mine safety set up by the European Coal and Steel Community held its first meeting in Luxembourg on September 26 under the chairmanship of M. Léon Daum, member of the Community's High Authority. It was decided to try to find ways and means of organizing mutual aid between the Community's mine-rescue centres, and in particular to draw up a mobilization plan for rescue services. A special committee comprising representatives of the regional and national rescue services of the Community countries will be set up to carry out this task. M. Marcel Gerlache, of the High Authority's Labour Problems Division, was nominated secretary of the new permanent body, which is known as the Mine Safety Commission.

CONTRACTS AND TENDERS

The following future procurements have been announced by the International Co-operation Administration (I.C.A.):

Formosa

36 cap lamps and batteries, charging equipment, 500 skullguards, and 4 truck chassis. Ten./28327. Project Implementation Order No. 84-22-303-9-70416. The issuing authority is the Central Trust of China, Purchasing Department, 68 Yen Ping Nan Road, Taipei, Taiwan (Formosa). Closing date, 4/11/57. B.O.T. Ref.: E.S.B. 23674/57 I.C.A. Telephone enquiries to Chancery 4411, extension 354.

	Contract Period	*Terminal Delivery Date*	*Amount (in U.S. dollars)*
Vietnam			
Coal and related fuels (PA 30-610-99-Li-8208)	30/8/57-28/2/58	31/7/58	400,000
Copper and copper products (PA 30-692-99-Li-8210)	30/8/57-31/3/58	30/9/58	50,000
Lead and lead base alloys and their products (PA 30-695-99-Li-8212)	30/8/57-31/3/58	30/9/58	25,000
Tin and tin base alloys and their products (PA 30-696-99-Li-8213)	30/8/57-31/3/58	30/9/58	50,000
Zinc and zinc base alloys and zinc products (PA 30-697-99-Li-8214)	30/8/57-31/3/58	30/9/58	75,000
Construction, mining and conveying equipment (PA 30-740-99-Li-8217)	30/8/57-31/3/58	30/9/58	200,000
Spain			
Construction, mining and conveying equipment (PA 57-740-Li-8202)	27/8/57-31/10/57	30/4/58	250,000

B.O.T. Ref.: E.S.B. 23257/I.C.A. Telephone to Chancery 4411, extension 354.

Machinery and Equipment

Spend Money to Find Money

More than £3,600,000 has been spent by mining companies investigating exclusive prospecting areas in Southern Rhodesia since 1947. This is apart from the money spent on investigating claims and orebodies in other areas. Intensive exploration is going on in almost all areas of the Colony and the number of proved deposits of various minerals in the country now makes an impressive list. Proved extensive deposits of spinning asbestos, lithium, metallurgical chrome and iron are among the world's top grades, and the broad front along which the mining industry is developing is encouraging at a time when copper prices are unsteady.

Southern Rhodesia's proved metals include gold, copper, coal, limestone, corundum, graphite, bismuth, tantalite and columbite. In addition, there is intensive prospecting for radioactive ores, and one company is prospecting for industrial diamonds.

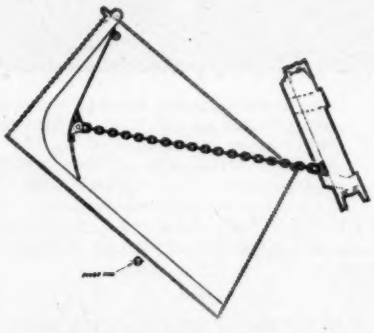
CLEANING HAULAGE CARS

An attachment which greatly improves the efficiency of Granby cars as they are used in the Premier diamond mine, South Africa, has been devised by the mine's engineers. The device effectively overcomes a problem that has for some time seriously affected production. It is described in *Optima*, Vol. 7, No. 3, a quarterly review published by the Anglo American Corporation of South Africa, Ltd.

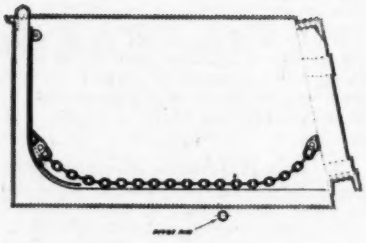
At Premier mine up to 422,000 tons of blueground and rock a month are transported along the main underground haulage system to the shaft. Granby cars with a capacity of 180 cu. ft. are used. The tacky nature of the blueground in the rainy season results in a certain amount of material adhering to the cars and remaining behind when their contents are tipped out. The amount of adhering material is increased by each load, and, unless removed, appreciably reduces the cars' carrying capacity.

It was found that manual cleaning of the cars on a useful scale hampered their movement to such an extent that there was no real improvement in the tonnage carried. The cost of the labour had also to be considered.

Various devices were tried in efforts to find an effective means of cleaning the cars mechanically. In one experiment, heavy chains were suspended on the back-plate of the Granby car. Another entailed the fitting of a second back-plate suspended by chains.



Further consideration of the problem resulted in the installation of a second back-plate hinged to the rim of the car and operated by an external link motion gear. This device was temporarily successful, but ceased to operate properly with the slightest distortion of the plate or the link gear. Under heavy-duty conditions such as exist at Premier, its maintenance would have been too great a burden.



The successful device, which has now been fitted to all Granby cars at the mine, consists of a $\frac{1}{16}$-in. steel plate suspended from the top of the back-plate of the car by means of five short lengths of $\frac{1}{2}$-in. chain, the bottom corners of the plate being connected to corresponding positions on the door of the car by two chains. The bottom of the plate is fitted with a lip of seven-ply conveyor belting.

The operation of the device is simple. As the car is tipped the door swings open and the false back-plate is pulled forward by the two chains. This scraping action, which has the virtue of being entirely automatic, sets in motion any ground which might otherwise have adhered to the bottom of the car.

The travel of the bottom of the swinging plate, determined by the length of the two chains connecting it to the door, is a material factor in the efficient operation of the device. A travel of about 5 in. is used. While a smaller movement is ineffective, excessive travel can damage the operating link motion of the car and can even result in its derailment as the back-plate, activated by the car door, bears with too great a force against the full load of rock.

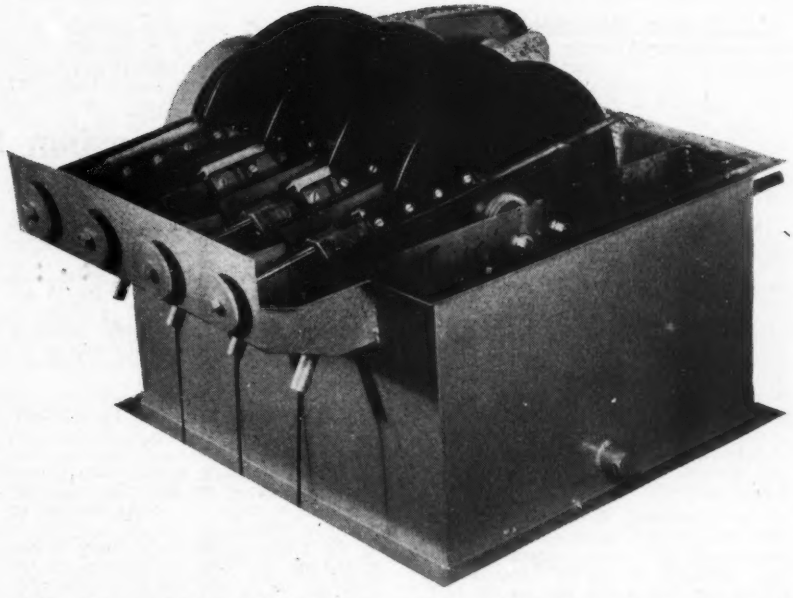
Being simple and robust and not easily damaged, the device is ideal for heavy-duty work. As a result of its full-scale adoption, not one car had to be cleaned manually at Premier mine during the last wet season.

NEW CONVEYOR BELT

Terylene polyester fibres have been selected for a new type of lightweight and non-inflammable belt manufactured by Rubber Improvement, Ltd. The N.C.B. has approved the new belt, and it is anticipated that it will be used extensively throughout the coal-mining industry.

The new cleaning device fitted to the Granby car. Above, the door is closed and the second back-plate is in the neutral position against the back of the car. At centre, the vehicle is shown tipped. Below, a view of the new 3-ply Terylene conveyor belt in use in a Durham colliery

Right is the new Knapp and Bates wet reagent feeder, while below is the AW-80 single-drum hoist by Joy-Sullivan Ltd.



The production of this belt is the outcome of considerable development work by Rubber Improvement, Ltd., in conjunction with Imperial Chemical Industries, Ltd. Work began after the Creswell Colliery disaster in 1950 and Rubber Improvement, Ltd., produced a non-inflammable belt, p.v.c. coated and using conventional six-ply cotton reinforcement.

In 1955 work began to produce an even better belt, and this new belt is the outcome of these experiments. It is composed of three plies of Terylene reinforced fabric coated with p.v.c. Half the thickness of a six-ply cotton belt, the new belt is lighter and much more flexible whilst being just as strong and, of course, non-inflammable. The increase in flexibility reduces slipping over pulleys, driving surfaces and drums, which was a problem with earlier p.v.c. belts. Its light weight enables it to be used more easily for movable face-conveyors. Troughing is reported to be excellent.

Both the low stretch and the low moisture absorption of Terylene prevents the belt varying in length with changes in humidity. The great strength of Terylene absorbs shock loads more readily so minimizing damage. Its flexibility prevents the p.v.c. from being strained or cracked as the belt passes over the pulleys. The new belt is marketed by Rubber Improvement, Ltd., of Wellingborough, Northamptonshire, under the trade name "Rilflex". Many "Rilflex" belts have already been sold overseas.

ILLUSTRATIONS AND LITERATURE

Particularly applicable to the mechanical and electronics industries, the facilities offered by Studio Irwin Technical, Ltd., are of interest to the mining industry. Indeed, the illustrations supplied by the company have been used in the manufacture of electric winders and one client is the Atomic Energy Authority.

A complete service for the engineer is available from this organization, covering the preparation of instructional material with particular reference to handbooks, sectioned and "exploded" perspective illustrations in line, halftone and full colour. The company also deals with the production of sales promotional matter from the commercial standpoint.

WET REAGENT FEEDER

For feeding all types of wet reagent, the Knapp and Bates disc-type feeder is simpler to operate and cheaper to install and maintain than existing cup- and disc-type feeders. A typical four-blade feeder consists of an all-welded steel, U-shaped 4½-gall. tank which is welded into an external steel tank. A ½-in. mild-steel hollow shaft, supported on two oilite bearings, passes through the tank and carries four 12-in. dia. steel discs. Four types of units are produced: Type A utilizes open bulkheads in which the same reagent may pass from cell to cell, whilst Types B, C and D utilize closed bulkheads in which different types of reagents may be placed.

The steel blades gather reagent from the compartments formed, and as they revolve deliver it to two horizontal steel wipers which are fitted radially to each blade. The liquid removed by the wipers falls by a trough to a receiving box and is discharged through ¼-in. dia. drain plugs. The position of these wipers is adjustable by single lead screws to give any blade setting between a fraction of an inch and the full length of 5 in.

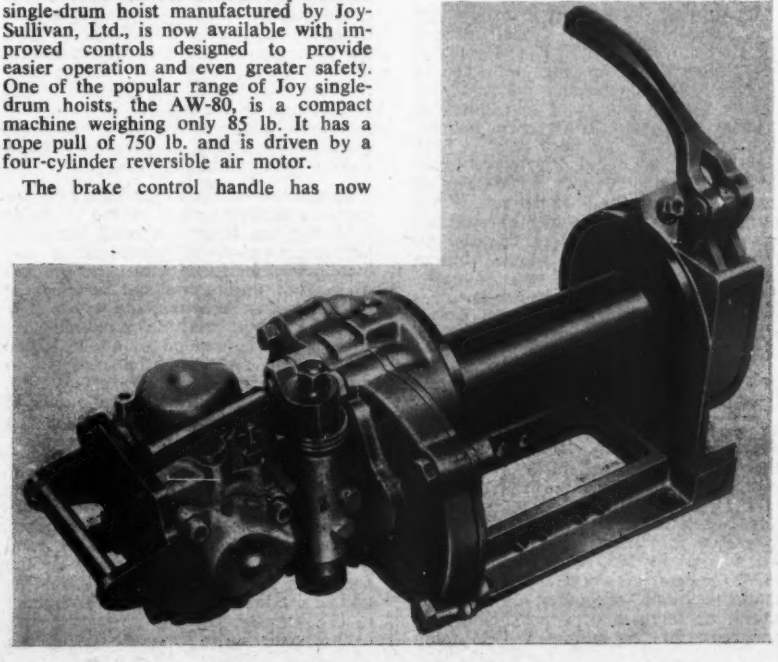
The unit is powered by a 0.125 horse-power 220-volt 50-cycle single-phase motor through a suitably guarded single V-belt; the motor gives a constant speed of 1,450 r.p.m., which is reduced to 59 r.p.m. through a reducing gear. Three sizes of pulley are available to give shaft revolutions of 39, 29 and 19 r.p.m.

IMPROVED HOIST CONTROLS

The latest model of the Joy AW-80 single-drum hoist manufactured by Joy-Sullivan, Ltd., is now available with improved controls designed to provide easier operation and even greater safety. One of the popular range of Joy single-drum hoists, the AW-80, is a compact machine weighing only 85 lb. It has a rope pull of 750 lb. and is driven by a four-cylinder reversible air motor.

The brake control handle has now been re-designed and provides a quicker action. By pressing down on the lever, which is spring-loaded, varying loads are applied to the brake band, giving a wide range of control. At the limit of its downward travel the lever locks the brake in the "on" position. Main improvement on the air motor throttle and reverse control is the provision of a "dead man's handle". The lever will automatically return to neutral from any action position when it is released.

The AW-80 hoist is 22 in. long, 9½ in. in width, and 11 in. high. It has a rope speed of 30 f.p.m. and the rope capacity is 286 ft. of ½-in. rope, 194 ft. of $\frac{7}{16}$ in. and 127 ft. of ⅜ in. A 3½ in. drum is fitted and this is 8 in. long. The flange dia. is 6¼ in. Air consumption of the hoist is 35 cu. f.p.m.



Metals and Minerals

Capacity Production of Magnesium Still Maintained

A comprehensive programme of technical reports on magnesium processing has been arranged by the Magnesium Association for its thirteenth Annual Convention at New York City on October 17 and 18. Development papers on processes and control techniques will be presented by leading American and British producers, among them being Mr. P. A. Fisher, deputy chief metallurgist of Magnesium Elektron, Ltd., whose subject will be quality control of magnesium castings. Two speakers at the Convention will discuss the long-range outlook for magnesium.

It is noteworthy that, against the general trend of non-ferrous metal production, output of primary magnesium in the U.S. continued at about capacity rate during the first seven months of 1957, ingot production during this period totalling 47,865 s.tons against 68,347 tons in all 1956. On the other hand, July saw the first substantial decline in shipment of magnesium wrought products for more than two years, total shipments of 714 tons representing a substantial decrease from the 941 tons delivered in June and the 1,001 tons shipped during the corresponding month of last year. Uncertainties in the over-all defence programme were among the factors contributing to this decline.

The Alabama Metallurgical Co., owned jointly by Dominion Magnesium and Brooks and Perkins, Inc., is reported to be nearing the final stages of negotiations for finances with which to build a magnesium plant at Selma, Alabama. Construction will very shortly be started on this $4,500,000 plant, which will have an ultimate capacity of 12,000 tons of magnesium yearly.

Japan will shortly start to export primary magnesium under a trial contract to Communist China. The Furukawa Magnesium Co., sole magnesium refiner in Japan, has concluded a contract with Peking for the export of seven tons of primary magnesium in barter for fluorite. The export price has been fixed at £310 per ton c.i.f. Shanghai. Previously Japan needed to import about 5,000 tons of magnesium annually, but there is now a surplus reflecting a decline in titanium exports and increased production by Furukawa Magnesium, whose present capacity is about 2,000 tons annually. The Japanese Government intends to restrict imports of magnesium and permit exports until March next year up to a ceiling of 500 tons.

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Rising demands for magnesium ores and related products in 1956 resulted in a marked increase in domestic production of magnesite and other magnesium compounds, states the Bureau of Mines, U.S. Department of the Interior, in its latest report. U.S. production of crude magnesite rose from 10 per cent of the world total in 1955 to 13 per cent in 1956. Estimated world production of crude magnesite amounted to 5,200,000 s.tons, an increase of approximately 11 per cent. Of the estimated 1956 total, 1,160,000 tons were produced in North America.

Magnesia, derived from sea water, well brines and bitterns, accounted for 53 per cent of domestic production in 1956, the remaining 47 per cent being produced from magnesite, brucite and dolomite.

PLATINUM IN THE OIL INDUSTRY

The oil industry is dependent on a platinum catalyst for the reforming process used to raise the octane number of premium petrols. Of major importance to the platinum metals industry is the magnitude of future consumption of platinum in the thermal reforming process, as regards both the total inventory of platinum on catalyst and the expected long-term consumption of platinum to maintain the volume of reforming.

Particularly interesting, therefore, is a forecast of probable requirements by M. J. Fowle, of the Atlantic Refining Co., Philadelphia, which appears in the current issue of the Johnson, Matthey publication, *Platinum Metals Review*. The author explains that platinum catalysts have the ability to produce the required product octane levels at far less cost than by any other catalyst. In this statement cost means the net cost, i.e., the capital cost of the process equipment, the cost of yield loss, and all direct operating costs, including the cost of the catalyst.

At the end of 1956 there were about 1,300,000 barrels per day of operating catalytic reforming capacity in the U.S., or slightly less than 14 per cent of the crude run. On the basis of averages published by the licensors of all the reforming processes, it could be expected that there would be in use for reforming catalyst purposes about 2,200,000 troy oz. of platinum by the end of 1964, and that new installations at that time would require about 60,000 oz. per year on a more or less continuing basis.

In addition to the larger bulk of platinum on catalyst, either in use or being made for use, there is a small but regular consumption of platinum in the manufacture of fresh catalyst, in the loss of catalyst during use and handling at the petroleum refineries, and in the processing of spent catalyst for platinum recovery. This amounted to about 30,000 oz. in 1956 and could be expected to reach approximately 70,000 oz. by 1965, which would then represent a continual consumption about equal to the platinum requirements for catalysts for new units.

With the rapid spread of catalytic reforming to the rest of the world, and the greater proportion of straight-run naphtha in the motor fuel for these markets, it would appear probable that the total world requirement for platinum in the petroleum industry could be estimated by taking a ratio of total crude throughput to U.S. throughput, with perhaps a two-to-three-year lag in the platinum uptake.

ALUMINIUM CANS IN THE U.S.

Reynolds Metals and Esso Standard Co. have announced what they term the first contract for aluminium cans in the history of the oil industry. The agreement calls for between 35,000,000 and 60,000,000 quart cans for motor oil. Reynolds will supply the aluminium and has arranged with two major container producers to make the cans. Production is expected to start before the end of the current year. Esso service stations will be provided with crushing machines to flatten the used cans for reclamation by Reynolds, and it is claimed that this facility will make the metal competitive with conventional cans, which are discarded after use. This development has been described as a major break-through in the aluminium industry's bid for part of the $1,600,000,000-a-year U.S. can market, which is dominated by tinplate.

The American Can Co., it was recently reported, has set up a research department to study ways of making aluminium cans economically. Its effort to develop an economical production method is said to be related to the increasing supplies of aluminium and to the fact that the company's tinplate costs have risen by over 90 per cent in the past ten years, thus narrowing the price gap between the two metals.

An announcement by the Continental Can Co. states that aluminium cans will appear generally on sale for the first time in the United States this week. The first cans to be sold commercially by this company will be produced by conventional methods used in tinplate, but early next year the company expects to introduce cans formed by a new extrusion process.

There is no reason to anticipate—at any rate for the present—any serious threat to tin as a result of aluminum's entry into such a dynamic and expanding market as the container field.

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The Australian Aluminium Production Commission has asked the Federal Government to limit imports of aluminium. It said that so much aluminium had gone to Australia from overseas in 1956-57 that the Commission had to sell 690 tons of Australian aluminium overseas at a loss. The Commission produces aluminium for the Australian market at Bell Bay, Tasmania.

THORIUM'S ATOMIC PROSPECTS

The story of the development of thorium metal has been declassified by the A.E.C. and some details of the various steps have been outlined by Horizons, Inc. By 1954, the company's research had developed an electrolytic process capable of yielding thorium to the purity specifications of A.E.C. at conversion cost of approximately $2 per lb.

While the original suppositions that its energy content would supersede that of uranium have not proved correct, its

greatly reduced cost of production and its lower density in comparison with uranium give thorium metal a strong future potential. A firm under contract to Brookhaven National Laboratory is constructing a liquid metal fuel homogeneous reactor, which employs in at least part of its operations a thorium-bismuth slurry as the reactor fuel. Being lighter than uranium, thorium may prove extremely useful in reactors of the future for atomic flight. Thorium also appears to be useful as a hardening agent for magnesium.

SARAWAK BAUXITE

Aluminium, Ltd., in a joint announcement with Mr. E. Ott, of the Ott Group—joint shareholders of Sematan Bauxite Ltd.—said that preparations for the mining of bauxite deposits in western Sarawak on the island of Borneo were proceeding satisfactorily. Shipments are expected to begin in 1958 with an anticipated yearly production of about 175,000 tons. The bauxite will go principally to Japan. International Aluminium, Ltd., has been appointed sales agent.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

The past week has been very uneventful for markets on the L.M.E. and it has been difficult to determine any definite trend in prices. Copper has tended higher but with diminishing business, whilst tin has developed a weaker undertone: lead has remained steady but zinc prices have shown a tendency to weaken.

COPPER'S STOCK POSITION

Although stocks of copper in official warehouses showed a further increase on Monday at 17,928 l.tons, the contango has tended to diminish which seems to indicate that a very much larger tonnage than was supposed is in hands which isolate it from the market; it is believed, however, that additional stocks will continue to become available and unless further action is taken to buy cash metal for retention, the contango indicated last week should be established.

General trade throughout the world has been only of a routine nature and it is drawing very near the time when the possibility of an autumn upswing in consumption becomes extremely remote. On the production side there have been several items of news from America that sources of production are either strike-bound or are being shut down for temporary overhaul and repairs and it is believed that the total tonnage so involved will go a long way towards helping to balance production against consumption over the next two months.

TIN'S GREATER BACKWARDATION

The feature of the tin market was a sudden increase in the backwardation at the week-end which it is believed stemmed from heavy deliveries having to be made to the Buffer Stock Manager. As in the case of copper, stocks show a slight increase of 3,678 tons but in view of the development of the backwardation, a very large proportion of this must already be in the hands of the Buffer Stock Manager. Yet as the market as a whole has no information as to the tonnages which he has bought, it is not possible to say whether a shortage of prompt metal will develop further or not, but the majority feel that the major portion of the Buffer Pool's purchases on the market have already fallen due.

Trade demand has slackened and this has brought about a fair volume of selling of forward metal and it would not be surprising to see the forward price sink to within a few pounds of the £730 support mark. On Thursday morning the Eastern price was equivalent to £738½ per ton c.i.f. Europe.

STEADY LEAD-ZINC MARKETS

The lead and zinc markets have been remarkably steady in face of the definite action in America to start going through the motions to have the duties raised. It now appears that an increase of the duties to 2.55 c. per lb. for lead and 2.1 c. per lb. for zinc is a distinct possibility and that the increases may become effective early in the New Year, although a minority feel that the Tariff Commission may move quicker than usual to enable the increases to be operative at an earlier date.

Trade demand for lead remains of a routine character but there appears to be a slight over-production, which is underlined by the fact that at the end of June producers' stocks in the U.S. amounted to 55,400 s.tons, which is the highest figure since January, 1955.

The demand for zinc has been a little better from the galvanizing trade and from the makers of die-casting alloys, but with other consumers being very reluctant to make new purchases it is probable that stocks are continuing to accumulate. Output in America is now beginning to feel the impact of the various closures which have taken place in recent months, but in Europe the level of production remains very steady, the O.E.E.C. production for August being 69,829 tonnes as compared with 67,666 for the previous month.

Closing prices and turnovers are:

THE WEEK ON THE L.M.E.

	Sept. 26 *Buyers*	*Sellers*	Oct. 4 *Buyers*	*Sellers*
COPPER				
Cash	£191½	£192	£190	£190½
Three months	£195	£195½	£193½	£194
Settlement	£192		£190½	
Week's turnover	6,700 tons		6,250 tons	
LEAD				
Current ½ month	£89	£89½	£88	£88½
Three months	£90	£90½	£89	£89½
Week's turnover	4,250 tons		3,750 tons	
TIN				
Cash	£740½	£741	£735	£735½
Three months	£740	£740½	£734½	£735
Settlement	£741		£735½	
Week's turnover	480 tons		875 tons	
ZINC				
Current ½ month	£71½	£71⅔	£70½	£70⅔
Three months	£72½	£72⅔	£71	£71½
Week's turnover	6,750 tons		5,450 tons	

LONDON METAL AND ORE PRICES, OCT. 3, 1957

METAL PRICES

Aluminium, 99.5%, £197 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) basis 20s. 0d./21s. 0d. nom. per unit, c.i.f.

Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 11s. 3d. lb.
Cerium (99% nett), £13 18s. lb. delivered U.K.
Chromium, Cr. 99%, 7s. 2d. lb.
Cobalt, 16s.-19s. lb.
Germanium, 99.99%, Ge. kilo lots 3s. 4d. per gram
Gold, 250s. 3d.

Iridium, £27/29 oz. nom.
Lanthanum (98/99%) 15s. per gram
Manganese Metal (96%-98%) £310
Magnesium, 2s. 5½d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £20/22 oz. nom.
Osmiridium, nom.
Palladium, £7 10s./£8 0s. oz.
Platinum U.K. and Empire Refined £31/£34 oz.
Imported £28 5s./£28 15s. nom.
Quicksilver, £84 ex-warehouse
Rhodium, £42 oz.
Ruthenium, £15/£17 oz. nom.
Selenium, 75s. nom. per lb.
Silver, 78½d. f. oz. spot and 78½d. f'd.
Tellurium, 15s. 16s. lb.

ORES AND OXIDES

Bismuth	30% 5s. 0d. lb. c.i.f. 18-20% 1s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semifriable) 48%	£19 5s. 0d. per ton c.i.f.
,, Hard Lumpy 45%	£19 5s. 0d. per ton c.i.f.
,, Refractory 40%	£13 0s. 0d. per ton c.i.f.
,, Smalls 44%	£18 0s. 0d. per ton c.i.f.
Baluchistan 48%	£12 0s. 0d. per ton f.o.b.
Columbite, 65% combined oxides, high grade	185s./190s. 0d. per unit
Fluorspar—	
Acid Grade. Flotated Material	£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)	156s. 0d. ex works
Lithium Ore—	
Petalite min. 3½% Li_2O	47s. 6d./52s. 6d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O	47s. 6d./52s. 6d. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O	£26 5s. per ton f.o.b. Beira
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite Raw (ground)	£21 0s./£22 0s. d/d
Manganese Ore Indian	
Europe (46%-48%) basis 130s. freight plus 5% surcharge	131d./133d. per unit c.i.f. nom.
Manganese Ore (43%-45%)	106d./108d. per unit c.i.f. nom.
Manganese Ore (38%-40%)	100d./102d. per unit nom. (including duty)
Molybdenite (85% basis)	8s. 5d. nom. per lb. (f.o.b.)
Titanium Ore—	
Rutile 95/97% TiO_2 (prompt delivery)	£47/£48 per ton c.i.f. Aust'n
Ilmenite 52/54% TiO_2	£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)	112s. 6d./117s. 6d. per unit c.i.f.
Vanadium—	
Fused oxide 90-95% V_2O_5	£12¼-£13¼ per unit c.i.f.
Zircon Sand (Australian) (65-66% ZrO_2)	£18 per ton c.i.f.

Mining Finance

Young "Rands" Still Striding On

The fact that South African gold and gold-uranium shares have generally been trying to recover during the past four or five months may well have been attributable to growing feelings that the Kaffir market could not indefinitely continue its downward trend at the pace which had been seen for many months previously.

More recently, currency developments have played an important role in the market's behaviour. But the recent meeting of the International Monetary Fund has evinced no suggestion that a higher sterling price for the metal is likely to be seen just yet. Any general revaluation of currencies also now seems to be out of the question for the present and the U.S. appears to have dashed any immediate hopes of putting its gold buying price up above $35 per oz. with the statement at the I.M.F. meeting from American Governor Mr. Randolph Burgess, that it was still the U.S. policy firmly to link the dollar to gold at $35. Accordingly, the Canadian and South African delegates, who had hoped to raise the gold price question, were more or less shot down before they got off the ground.

But the Kaffir market has remained generally good with increasing investment attention being directed to the new mines which, in the Free State, are commonly led by Free State Geduld and in the Klerksdorp district by Hartebeestfontein.

In the circumstances, and against the gold price background, it is difficult to avoid the conclusion that investment quarters generally in this country and on the Continent are being steadily more and more impressed by the succession of improving monthly returns from the South African gold-uranium operators over the past twelve months or more. In this context, of course, it is the post-war mines in the O.F.S. and Western Transvaal which have been claiming attention.

This week there have been the September returns. They have been based on a gold price (which fluctuates month by month in accordance with movements in the sterling-dollar exchange market), of 250s. 5d. per oz. against 250s. 11d. in August. Despite this factor, and the possibility that some of the mines worked a shorter working month in September than in August, the latest returns are unquestionably good so far as the newer mines are concerned.

The general picture is that these young mines are gradually building up tonnages in so far as labour supply permits, plant capacities being for the most part ahead of current outputs. From mine to mine, the past month's figures do not suggest any general variation of trend in working costs, circumstances evidently varying so much from one property to another. But the overall impression one has of these new producers is of a continuing position of gradually rising production coupled with an improving grade of ore milled as the mines become more established and smaller proportions of development rock are included in mill feeds.

Outstanding among these producers have again been the newer mines of the Western Transvaal and Orange Free State. Marketwise, all eyes continue to be focused on Free State Geduld as the leader of the O.F.S. list, though it is not always easy to understand why this should be so. However, Free State Geduld is continuing to do very well and last month obtained a working profit of £310,000 against £302,000 and, apart from Western Holdings, most of the other Free Staters more than held their ground.

More impressive still are the achievements of the Klerksdorp area mines among which last month Hartebeestfontein profits (£530,000), Buffels (£300,000) and Stilfontein (£444,000), have all shown that there remains much scope in gold-uranium operations in this region.

LONDON MARKET HIGHLIGHTS

On Thursday and Friday of last week, the recovery in Kaffirs which had developed on the preceding days was well maintained. Once again, the driving force behind the rally was provided by Johannesburg, although some of this Cape buying undoubtedly originated from Continental sources. London, while no longer a seller, provided little stimulus to the movement. Hopes and anticipations regarding the forthcoming September profit figures and subsequent quarterly reports began to be reflected in prices.

St. Helena and Harmony, for instance, responded to a demand inspired by hopes of good developments in the September quarter from their respective new shaft areas. Hartebeest, too, moved ahead on hopes—since confirmed—of a new record profit earned in September.

Monday, however, saw the picture change. Weakness on Wall Street and end-account sales here, coupled with the later rattling of chains from the Labour Party Conference at Brighton, produced a fairly widespread reaction on the Stock Exchange. To make matters worse, *Aurora Borealis* was blamed for a severe disruption in communications with the Cape. Consequently, with Johannesburg temporarily unable to do business with London, Kaffir prices soon succumbed to the prevailing dullness. Selling was by no means severe and on Tuesday some initial hesitancy was replaced by a firmer trend in the later dealings. O.F.S. issues particularly benefited in view of the imminent monthly profit figures.

At the time of writing, the monthly returns have made a satisfactory impression with Free State Geduld (75s.) taking the lead.

It seems that the view is being taken at last that with the present obscure prospect for Industrial shares and the more promising trend of Kaffirs, the time is now ripe for a selective acquisition of "good class" gold and uranium producers' and Finance shares. The newer mines should have the most appeal in view of the hopes connected with the forthcoming quarterly reports, while a good risk coverage is provided by such shares as "Ofsits" with their added attraction of having a strong financial background and a rising income from the young producers.

Elsewhere in mining markets during the past few days, Platinums remained uniformly dull and are beginning to show attractive yields, while in Diamonds there was little alteration on balance. Australian and West African golds did not change a great deal, but Ashanti (19s. 9d.) remained dull despite the imminent news of their high profits for the financial year just ended.

Base-metal stocks were generally neglected. In Coppers Rhodesia-Katanga (now 24s. 3d.) fluctuated wildly in a sensitive market between 20s. 7½d. and 25s. and a late rally lifted "Tanks" to 127s. 6d. Tins were idle apart from some buying of Beralt (38s. 6d.) caused by the fairly high final dividend still in the price. Little interest was reported in the lead-zinc section.

RECORDS FOR ASHANTI

In the last year or two Ashanti Goldfields Corp., Ghana's richest and oldest gold producer, has had in hand a long reconstruction and redevelopment programme. Only during the past year have the results of this programme been bearing fruit. Ashanti's monthly return for September completes the company's financial year. And with last month's figures it is now possible to show that during 1956-57 there was a record tonnage throughput and that gold recovered at 275,332 oz. was also a record.

Ashanti always provides a good example of how monthly profit returns should be made by mining companies of this calibre. The corporation's September return discloses that estimated total profit for the year to September 30 last was £1,344,000 before tax against £650,000 in the previous year.

For Ashanti, with its new shaft, it has, idiomatically, been a long haul. The fruits are only now being reaped and it is only to be hoped that conditions in Ghana in the present political context, will not nullify the great work which this London company has so expensively accomplished during the past few years.

Financial News and Results

"Economic Aid" for Mazapil.—Trading profits of Mazapil Copper were severely reduced in 1956 from £259,374 to £132,618. Profit after tax fell to £76,486 from £115,278, and the dividend is passed (last year 10 per cent). In his review, Mr. T. P. Berington, the chairman, points out that were it not for Mexican production and export taxes which in effect reduce the market value of the company's copper by one-third, Mazapil could work its deposits profitably with the copper price as low as 25 c. per lb. As a result of negotiations with the Mexican Government, Mazapil is now to receive as "economic aid" a refund of a substantial proportion of the taxes levied on production since July, 1956. The money so received is to be used in the first place to reimburse operating losses, and the balance will be available as a tax-free contribution (not to exceed 55 per cent) to the cost of Mazapil's expansion programme, which includes an increase in the scale of operations on the new sulphide orebody at Cata Arroyo and a new flotation mill to handle 1,000 tons a day. The agreement provides that any profits earned on copper operations since the beginning of 1956 shall be applied to the cost of the project. Meeting, London, October 23.

Beralt an O.T.C.—Beralt Tin and Wolfram announce that the directors are satisfied that the company will qualify as an Overseas Trade Corporation as from September 14, 1957. This is a result of the formation of the new subsidiary, Beralt Tin and Wolfram (Sales), to handle the U.K. sales end of the business, and other measures taken after consultation with the U.K. tax authorities.

Bonville and Uranium.—The annual report of Bonville Gold Mines discloses that the company continues to study its 600-acre uranium property in Faraday Township. The study is being made in relation to the current important findings at Faraday Uranium Mines' property, which adjoins Bonville's ground. The company's original 12-claim gold property in Villebon, Quebec, has been abandoned. Bonville's two other uranium prospects, one in Spragge Township, Ontario (near Pronto Uranium Mines) and the other at Athabaska, Saskatchewan (near Gunnar Mines' property) were both idle.

Massberyl Lithium.—Massberyl Lithium Co.'s annual report shows that the company has acquired a 60-claim base-metal prospect at Ogani Lake in the Papaonga Lake area, Red Lake Mining Division, about 60 miles north of Sioux Lookout, Ontario. Work on the property has included ground and airborne geophysical surveys. Reports on the former work are in preparation. On the company's copper-gold prospect in the Chibougamau area of Quebec a 19-hole diamond drilling programme was carried out, but results were inconclusive.

Chenderiang Profits Halved. — At £10,943, net profits after tax for 1956/7 of Chenderiang Tin were less than half of the previous year's £24,962. Transfers to reserves totalled £4,000 (£10,000) and the 15 per cent final absorbs £2,156. Total dividends for the year were 20 per cent on the reduced capital of £75,000, against 20 per cent on £100,000 last year. Meeting, London, November 22.

Kinta Kellas Pays More.—Although earnings of Kinta Kellas Tin in the year to March 31, 1957, were slightly lower than in the previous twelve months, a final payment of 15 per cent is proposed, making a total of 20 per cent for the year against last year's single payment of 10 per cent. Profits before tax were £18,205 compared with £19,297, and tax (calculated on an O.T.C. basis) took £6,800 against £2,689. However, no appropriation comparable with last year's £20,000 to general reserve has been made. Mr. P. J. Burgess is chairman. Meeting, London, October 11.

Galkeno to Raise Debenture.—Wet conditions underground, causing heavy dilution of ore, have made it necessary for Galkeno Mines, the Keno Hill silver-lead-zinc producer, to embark on a new depth programme including a shaft and a low level adit. To assure continuity in this programme the company have privately placed a five-year 6 per cent convertible debenture of $400,000, $300,000 of which will be spent on the depth programme and the remainder on outside exploration. Galkeno Mines was formerly known as Mackeno Mines.

Algom Reports Excellent Results.—A report on the first six months of full operation by Algom Uranium Mines fully justifies the optimism expressed at the time of the annual meeting in April. At that time Mr. E. B. Gillanders, the managing director, estimated that monthly operating profits should "easily" be $1,750,000. In fact, the company has made a surplus of $12,122,000, or a little over $2,020,000 per month. After deducting interest, taxes and administration, but before depreciation and pre-production write-offs, net profit was $9,825,000. Average head content of the ore was 2.32 lb. per ton, which compares well with the average diluted reserve grade of 2.43 lb. Algom Uranium Mines are members of the Rio Tinto group.

Tekka Ltd.—Profits before tax of Tekka Ltd. in the year to March 31 showed a slight reduction from those for the previous year (£22,191 compared with £27,947), but taxation reduced its share from £14,745 to £7,610 leaving taxed profits of £14,581. Capital repayments totalling 7s. 6d. were made in the course of the year, and dividends on the 12s. 6d. shares amounted to 1s. against 1s. 1½d. on £1 shares last year. Meeting, Redruth, November 7. Mr. Donald W. Thomas is chairman.

Ulu Klang Wind Up.—At a meeting held in Kuala Lumpur last Friday Ulu Klang Tin was placed in liquidation.

The Proprietors of Patent No. 710761 for "A Gelatin Dynamite Explosive Composition" desire to secure commercial exploitation by Licence or otherwise in the United Kingdom. Replies to Haseltine Lake and Co., 28 Southampton Buildings, Chancery Lane, London, W.C.2.

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